

⑦

Available = $\begin{bmatrix} 3 & 3 & 2 \end{bmatrix}$

Allocation = Max =

	<u>Allocation</u>	<u>Max</u>
	A B C	A B C
P_0	$\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$	$\begin{bmatrix} 7 & 5 & 3 \end{bmatrix}$
P_1	$\begin{bmatrix} 2 & 0 & 0 \end{bmatrix}$	$\begin{bmatrix} 3 & 2 & 2 \end{bmatrix}$
P_2	$\begin{bmatrix} 3 & 0 & 2 \end{bmatrix}$	$\begin{bmatrix} 9 & 0 & 2 \end{bmatrix}$
P_3	$\begin{bmatrix} 2 & 1 & 1 \end{bmatrix}$	$\begin{bmatrix} 2 & 2 & 2 \end{bmatrix}$
P_4	$\begin{bmatrix} 0 & 0 & 2 \end{bmatrix}$	$\begin{bmatrix} 4 & 3 & 3 \end{bmatrix}$

Need = Max - Allocation

$\begin{bmatrix} 7 & 4 & 3 \\ 1 & 2 & 2 \\ 6 & 0 & 0 \\ 0 & 1 & 1 \\ 4 & 3 & 1 \end{bmatrix}$

② check $P_1 \Rightarrow j = 1$

$$\text{Finish}[1] = F \quad \checkmark$$

$$\text{Need}_1 \leq \text{Work}$$

$$[1 \ 2 \ 2] \leq [3 \ 3 \ 2] \quad \checkmark$$

③ P_1 finishes.

$$\text{Finish}[1] = T$$

$$\text{Work} = \text{Work} + \text{Allocation}_1$$

$$= [3 \ 3 \ 2] + [2 \ 0 \ 0]$$

$$= [5 \ 3 \ 2]$$

$$\text{Finish} = [F, T, F, F, F]$$

$$\text{Work} = [5 \ 3 \ 2]$$

② check P2 : $i = 2$

Finish [2] = F ✓

Need₂ ≤ work

[6 0 0] ≤ [5 3 2] ✗

② check P3 : $i = 3$

Finish [3] = F ✓

Need₃ ≤ work

[0 1 1] ≤ [5 3 2] ✓

③ P3 finishes.

Finish [3] = T

Work = Work + Allocation₃

$$= \begin{bmatrix} 5 & 3 & 2 \end{bmatrix} + \begin{bmatrix} 2 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 7 & 4 & 3 \end{bmatrix}$$

Finish = [F T F T F]

Work = [7 4 3]

② Check P4: $j = q$

Finish[4] = F ✓

Need_q ≤ Work

[4 3 2] ≤ [7 4 3] ✓

③ P4 finishes.

Finish[4] = T

Work = Work + Allocation_q

= [7 4 3] + [0 0 2]

= [7 4 5]

Finish = [F T F T T]

Work = [7 4 5]

② check PO: $j = 0$

Finish[0] = False ✓

Need₀ ≤ work

[7 4 3] ≤ [7 4 5] ✓

③ P0 finishes:

Finish[0] = True

work = work + Allocation₀

= [7 4 5] + [0 1 0]

= [7 5 5]

Finish = [T T F T T]

work = [7 5 5]

② check P2; $i = 2$

$\text{Finish}[2] = \text{False} \checkmark$

$\text{Need}_2 \leq \text{work}$

$[6 \ 0 \ 0] \leq [7 \ 5 \ 5] \checkmark$

③ P2 finishes.

$\text{Finish}[2] = \text{True}$

$\text{work} = \text{work} + \text{Allocation}_2$

$= [7 \ 5 \ 5] + [3 \ 0 \ 2]$

$= [10 \ 5 \ 7]$

$$\text{Finish} = [7 \quad 7 \quad 7 \quad 7 \quad 7]$$

$$\text{Work} = [10 \quad 5 \quad 7]$$

Conclusion :

① The system is in a safe state

② safe sequence

$$= \langle P1, P3, P4, P0, P2 \rangle$$
